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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/905,052	07/12/2001	Hiroshi Samukawa	03310/018001	3451

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ART UNIT	**PAPER NUMBER**
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7

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/905,052	Applicant(s) SAMUKAWA, HIROSHI	
	Examiner Lynette T. Umez-Eronini	Art Unit 1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *6/11/2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) *1-8* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-8* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 9-18 in Paper No. 6 is acknowledged.

Information Disclosure Statement

2. The information disclosure statement filed July 21, 2001 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because Reference No. A1 is written in Japanese and lacks an English translation. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 9, 10, and 15-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 9, 10, 16 and 18, "desired position;" and

In claims 15, 17, and 18, "desired shape;" are indefinite because "desired," reads on anything imagined. It is suggested --desired-- be deleted.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 9-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Suzuki et al. (US 6,218,022 B1) and in further view of Takahaashi et al. (US 6,233,821 B1).

Applicant's prior art teaches, " . . . a coating solution containing a polyimide precursor polyamic acid is applied and dried to form a precursor layer **122** based on the polyamic acid (FIG, 8(b). Then the assembly is heated to imidate the polyamic acid contained in precursor layer **122**. Then, . . . the resin layer **123** is exposed and developed to form an alkali-resistant resist layer patterned in a predetermined shape. . . . and resin layer **123** is exposed at the bottom of this opening **130**. Then, the assembly is immersed into an etching solution to remove resin layer **123** exposed at the bottom of opening **130** (etching). Resin layer **123** formed on the surface . . . has openings **130** at the bottom . . ." (Specification, page 1, line 20 – page 2, line 14).

"Known etching solutions used for the process of etching resin layer **123** include those containing . . . an alcohol, an amine and water . . ." (Specification, page 2, lines 19-23). "Amine-free solutions consisting of an alkali compound such as tetramethylammonium hydroxide . . . have been proposed" (Specification, page 2, lines 30-33). The aforementioned reads on,

A method for etching a resin layer, comprising:

forming a film-like resin layer based on a polyimide;

providing a resist layer having an opening at a desired position on a surface of the resin layer; and

etching with an alkali compound that comprises at least one selected from the group consisting of an alkali metal hydroxide and a quaternary ammonium hydroxide, **in claims 9 and 10**; and

forming a film-like resin layer comprises applying a coating solution, **in claims 13 and 14.**

Applicant's prior art fails to teach bringing an etching solution at 65°C or more into contact with the resin layer, wherein the etching solution comprises 3 to 65% by weight alcohol, 10 to 55% by weight alkali compound and water in a weight of 0.75 to 3.0 times a weight of the alkali compound, and wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms, **in claims 9 and 10**.

Suzuki teaches, "A resin etching solution containing . . . an alkali metal compound and water, or an aliphatic alcohol, an aliphatic amine, . . . and a process for

etching a polyimide film . . ." (Abstract). "In addition, the alkali metal compound is most preferably potassium hydroxide . . . but other substances such as sodium hydroxide and lithium hydroxide may also be used, . . ." (column 3, lines 53-57). "Also, they may used in concentrations of about 10-48% is preferred" (column 3, lines 57-64). "The resin etching solution . . . comprises . . . propylene glycol (same as applicant's diol)" . . . they are used in a range of 1%-40%, and most preferably 5%-30% (column 4, lines 23-51). Table 2 (column 10, lines 33-43) lists the composition of potassium hydroxide and water having the same wt %. Hence, one can see that the concentration of the etchant components encompasses those of the claimed invention. Suzuki further teaches, "The etching temperature . . . is generally in the range of 20°C to the boiling point of the system, and preferably 30°C-90°C" (column 4, lines 1-4).

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify applicant's prior art by employing a resin etching solution that comprises a 3 to 6 carbon diol, water, and alkali metal hydroxide, encompasses 3 to 65% by weight alcohol, 10 to 55 % by weight alkali compound, and 0.75 to 3 wt % water, and etches polyimide within a temperature of 65°C, as taught by Suzuki for the purpose of rapidly etching polyimides (Suzuki, column 2, lines 48-57).

Applicant's admitted prior art in view of Suzuki differs in failing to teach having an imidation degree of from 50 to 98, **in claims 9, 10 and 13**; and an imidation degree of less than 50%, **in claims 11 and 12**.

Takahashi teaches, "In order to achieve flatness, the imidation degree of the polyamic is preferably 20% or less, more preferably 10% less" (column 6, lines 54-56). "The polyamic acid (same as applicant's resin) solution is partially imidated . . . to reach an imidation degree of 80% or more" (column 4, lines 59-61), which falls within the range of an imidation degree of from 50 to 98 as claimed in the present invention.

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify applicant's admitted prior art in view of Suzuki by employing Takahashi's method of imidating a resin for the purpose of obtaining a flexible printed wiring board with high heat resistance (Takahashi, column 2, lines 29-30).

7. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Suzuki (US '022 B1) and in further view of Takahaashi (US '821 B1).

Applicant's admitted prior art teaches, " . . . a coating solution containing a polyimide precursor polyamic acid is applied and dried to form a precursor layer **122** based on the polyamic acid (FIG, 8(b). Then the assembly is heated to imidate the polyamic acid contained in precursor layer **122** . . . . Then, a resist coating solution is applied on the surface of resin layer **123** . . . the resin layer **123** is exposed and developed to form an alkali-resistant resist layer patterned in a predetermined shape. . . . and resin layer **123** is exposed at the bottom of this opening **130**. Then, the assembly is immersed into an etching solution to remove resin layer **123** exposed at

the bottom of opening **130** (etching). Resin layer **123** formed on the surface . . . has openings **130** at the bottom . . . ." (Specification, page 1, line 20 – page 2, line 14). "Known etching solutions used for the process of etching resin layer **123** include those containing . . . an alcohol, an amine and water . . ." (Specification, page 2, lines 19-23). "Amine-free solutions consisting of an alkali compound such as tetramethylammonium hydroxide . . . have been proposed" (Specification, page 2, lines 29-32). The aforementioned reads on,

A method for manufacturing a flexible wiring board comprising:

applying a coating solution containing a polyimide precursor on a side of a substrate having at least a metal wiring on which the metal wiring is provided;

drying the coating solution to form a precursor layer based on a polyimide;

heating the precursor layer to form a polyimide resin layer;

applying a resist layer coating solution on a surface of the resin layer;

drying the resist layer coating solution to form a resist layer;

patterning the resist layer in a desired shape to form an opening;

preparing an etching solution; and

bringing the etching solution in contact with the resin layer located at a bottom of the opening to etch the resin layer.

Applicant's prior art fails to teach bringing an etching solution at 65°C or more into contact with the resin layer located at a bottom of the opening, wherein the etching solution comprises 3 to 65% by weight alcohol, 10 to 55% by weight alkali compound and water in a weight of 0.75 to 3.0 times a weight of the alkali compound, and wherein

the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms.

Suzuki teaches, "A resin etching solution containing . . . an alkali metal compound and water, or an aliphatic alcohol, an aliphatic amine, . . . and a process for etching a polyimide film . . ." (Abstract). "In addition, the alkali metal compound is most preferably potassium hydroxide . . . but other substances such as sodium hydroxide and lithium hydroxide may also be used, . . ." (column 3, lines 53-57). "Also, they may used in concentrations of about 10-48% is preferred" (column 3, lines 57-64). "The resin etching solution . . . comprises . . . propylene glycol (same as applicant's diol)" . . . they are used in a range of 1%-40%, and most preferably 5%-30% (column 4, lines 23-51). Table 2 (column 10, lines 33-43) lists the composition of potassium hydroxide and water having the same wt %. Hence, one can see that the concentration of the etchant components encompasses those of the claimed invention. Suzuki further teaches, "The etching temperature . . . is generally in the range of 20°C to the boiling point of the system, and preferably 30°C-90°C" (column 4, lines 1-4).

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify applicant's prior art by employing a resin etching solution that comprises a 3 to 6 carbon diol, water, and alkali metal hydroxide, encompasses 3 to 65% by weight alcohol, 10 to 55 % by weight alkali compound, and 0.75 to 3 wt % water, and etches polyimide within a temperature of 65°C, as taught by Suzuki for the purpose of rapidly etching polyimides (Suzuki, column 2, lines 48-57).

Applicant's admitted prior art in view of Suzuki differs in failing to teach heating the precursor layer to form a polyimide resin layer having an imidation degree of from 50 to 98% and an imidation degree of less than 50%.

Takahashi teaches, "In order to achieve flatness, the imidation degree of the polyamic is preferably 20% or less, more preferably 10% less" (column 6, lines 54-56). "The polyamic acid (same as applicant's resin) solution is partially imidated . . . to reach an imidation degree of 80% or more" (column 4, lines 59-61), which falls within the range of an imidation degree of from 50 to 98 as claimed in the present invention.

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify applicant's admitted prior art in view of Suzuki by employing Takahashi's method of imidating a resin for the purpose of obtaining a flexible printed wiring board with high heat resistance (Takahashi, column 2, lines 29-30).

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Suzuki (US '022 B1) and further in view of Takahaashi (US '821 B1).

Applicant's prior art teaches, "A process for manufacturing such a flexible wiring board . . . Opposite to the side of this metal wiring **115** on which base film **111** is applied, a coating solution containing a polyimide precursor polyamic acid is applied and dried to form a precursor layer **122** based on the polyamic acid (FIG, 8(b). Then the assembly is heated to imidate the polyamic acid contained in precursor layer **122**. Then, . . . the resin layer **123** is exposed and developed to form an alkali-resistant

resist layer patterned in a predetermined shape. . . . and resin layer **123** is exposed at the bottom of this opening **130**. Then, the assembly is immersed into an etching solution to remove resin layer **123** exposed at the bottom of opening **130** (etching). Resin layer **123** formed on the surface of this flexible wiring board **110** has openings **130** at the bottom of which is exposed metal wiring **115**" (Specification, page 1, line 15 - page 2, line 14). "Known etching solutions used for the process of etching resin layer **123** include those containing . . . an alcohol, an amine and water . . ." (Specification, page 2, lines 19-23). "Amine-free solutions consisting of an alkali compound such as tetramethylammonium hydroxide . . . have been proposed" (Specification, page 2, lines 29-32). The aforementioned reads on,

A method for manufacturing a flexible wiring board comprising:

applying a coating solution containing a polyimide on the side of a substrate having at least a metal foil;

drying the coating solution to form a resin layer;

applying a resist layer coating solution on a surface of the resin layer;

drying the resist layer coating solution to form a resist layer;

patterning the resist layer in a desired shape to form an opening;

preparing an etching solution;

bringing the etching solution into contact with the resin layer located at a bottom of the opening to etch the resin layer; and

and providing a resist layer having an opening at a desired position on the opposite side to a side of the metal foil on which the resin layer is formed to remove the metal foil exposed at a bottom of the opening in the resist layer.

Applicant's admitted prior art fails to teach bringing an etching solution at 65°C or more into contact with the resin layer, wherein the etching solution comprises 3 to 65% by weight alcohol, 10 to 55% by weight alkali compound and water in a weight of 0.75 to 3.0 times a weight of the alkali compound, and wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms.

Suzuki teaches, "A resin etching solution containing . . . an alkali metal compound and water, or an aliphatic alcohol, an aliphatic amine, . . . and a process for etching a polyimide film . . ." (Abstract). "In addition, the alkali metal compound is most preferably potassium hydroxide . . . but other substances such as sodium hydroxide and lithium hydroxide may also be used, . . ." (column 3, lines 53-57). "Also, they may used in concentrations of about 10-48% is preferred" (column 3, lines 57-64). "The resin etching solution . . . comprises . . . propylene glycol (same as applicant's diol)" . . . they are used in a range of 1%-40%, and most preferably 5%-30% (column 4, lines 23-51). Table 2 (column 10, lines 33-43) lists the composition of potassium hydroxide and water having the same wt %. Hence, one can see that the concentration of the etchant components encompasses those of the claimed invention. "The etching

temperature . . . is generally in the range of 20°C to the boiling point of the system, and preferably 30°C-90°C" (column 4, lines 1-4).

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify applicant's prior art by employing a resin etching solution that comprises a 3 to 6 carbon diol, water, and alkali metal hydroxide, encompasses 3 to 65% by weight alcohol, 10 to 55 % by weight alkali compound, and 0.75 to 3 wt % water, and etches polyimide within a temperature of 65°C, as taught by Suzuki for the purpose of rapidly etching polyimides (Suzuki, column 2, lines 48-57).

Applicant's prior art in view of Suzuki differs in failing to teach applying a coating solution containing a polyimide having an imidation degree of from 50 to 98.

Takahashi teaches, "The polyamic acid (same as applicant's resin) solution is partially imidated . . . to reach an imidation degree of 80% or more" (column 4, lines 59-61), which falls within the range of an imidation degree of from 50 to 98 as claimed in the present invention.

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify applicant's admitted prior art in view of Suzuki by employing Takahashi's method of imidating a resin for the purpose of obtaining a flexible printed wiring board with high heat resistance (Takahashi, column 2, lines 29-30).

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Suzuki (US '022 B1) and further in view of Takahaashi (US '821 B1).

Applicant's prior art teaches, "A process for manufacturing such a flexible wiring board . . . Opposite to the side of this metal wiring **115** on which base film **111** is applied, a coating solution containing a polyimide precursor polyamic acid is applied and dried to form a precursor layer **122** based on the polyamic acid (FIG, 8(b). Then the assembly is heated to imidate the polyamic acid contained in precursor layer **122**. Then, . . . the resin layer **123** is exposed and developed to form an alkali-resistant resist layer patterned in a predetermined shape. . . . and resin layer **123** is exposed at the bottom of this opening **130**. Then, the assembly is immersed into an etching solution to remove resin layer **123** exposed at the bottom of opening **130** (etching). Resin layer **123** formed on the surface of this flexible wiring board **110** has openings **130** at the bottom of which is exposed metal wiring **115**" (Specification, page 1, line 15 - page 2, line 14). "Known etching solutions used for the process of etching resin layer **123** include those containing . . . an alcohol, an amine and water . . ." (Specification, page 2, lines 19-23). "Amine-free solutions consisting of an alkali compound such as tetramethylammonium hydroxide . . . have been proposed" (Specification, page 2, lines 29-32). The aforementioned reads on,

A method for manufacturing a flexible wiring board comprising:

applying a coating solution containing a polyimide on the side of a substrate having at least a metal wiring on which the metal wiring is provided;

drying the coating solution to form a resin layer;

applying a resist layer coating solution on a surface of the resin layer;

drying the resist layer coating solution to form a resist layer;

patterning the resist layer in a desired shape to form an opening;

preparing an etching solution; and

and bringing the etching solution into contact with the resin layer located at a bottom of the opening to etch the resin layer.

Applicant's prior art fails to teach bringing an etching solution at 65°C or more into contact with the resin layer located at a bottom If the opening, wherein the etching solution comprises 3 to 65% by weight alcohol, 10 to 55% by weight alkali compound and water in a weight of 0.75 to 3.0 times a weight of the alkali compound, and wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms.

Suzuki teaches, "A resin etching solution containing . . . an alkali metal compound and water, or an aliphatic alcohol, an aliphatic amine, . . . and a process for etching a polyimide film . . ." (Abstract). "In addition, the alkali metal compound is most preferably potassium hydroxide . . . but other substances such as sodium hydroxide and lithium hydroxide may also be used, . . ." (column 3, lines 53-57). "Also, they may used in concentrations of about 10-48% is preferred" (column 3, lines 57-64). "The resin etching solution . . . comprises . . . propylene glycol (same as applicant's diol)" . . . they are used in a range of 1%-40%, and most preferably 5%-30% (column 4, lines 23-51). Table 2 (column 10, lines 33-43) lists the composition of potassium hydroxide

and water having the same wt %. Hence, one can see that the concentration of the etchant components encompasses those of the claimed invention. "The etching temperature . . . is generally in the range of 20°C to the boiling point of the system, and preferably 30°C-90°C" (column 4, lines 1-4).

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify applicant's prior art by employing a resin etching solution that comprises a 3 to 6 carbon diol, water, and alkali metal hydroxide, encompasses 3 to 65% by weight alcohol, 10 to 55 % by weight alkali compound, and 0.75 to 3 wt % water, and etches polyimide within a temperature of 65°C, as taught by Suzuki for the purpose of rapidly etching polyimides (Suzuki, column 2, lines 48-57).

Applicant's prior art in view of Suzuki differs in failing to teach applying a coating solution containing a polyimide having an imidation degree of from 50 to 98.

Takahashi teaches, "The polyamic acid (same as applicant's resin) solution is partially imidated . . . to reach an imidation degree of 80% or more" (column 4, lines 59-61), which falls within the range of an imidation degree of from 50 to 98 as claimed in the present invention.

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify applicant's admitted prior art in view of Suzuki by employing Takahashi's method of imidating a

resin for the purpose of obtaining a flexible printed wiring board with high heat resistance (Takahashi, column 2, lines 29-30).

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Suzuki (US '022 B1) and Takahaashi (US '821 B1).

Applicant's prior art teaches, "A process for manufacturing such a flexible wiring board . . . Opposite to the side of this metal wiring **115** on which base film **111** is applied, a coating solution containing a polyimide precursor polyamic acid is applied and dried to form a precursor layer **122** based on the polyamic acid (FIG, 8(b). Then the assembly is heated to imidate the polyamic acid contained in precursor layer **122**. Then, . . . the resin layer **123** is exposed and developed to form an alkali-resistant resist layer patterned in a predetermined shape. . . . and resin layer **123** is exposed at the bottom of this opening **130**. Then, the assembly is immersed into an etching solution to remove resin layer **123** exposed at the bottom of opening **130** (etching). Resin layer **123** formed on the surface . . . has openings **130** at the bottom . . ." (Specification, page 1, lines 15 – page 2, line 14). "Known etching solutions used for the process of etching resin layer **123** include those containing . . . an alcohol, an amine and water . . ." (Specification, page 2, lines 19-23). "Amine-free solutions consisting of an alkali compound such as tetramethylammonium hydroxide . . . have been proposed" (Specification, page 2, lines 29-32). The aforementioned reads on,

A method for manufacturing a flexible wiring board comprising:

applying a coating solution containing a polyimide on the side of a substrate having at least a metal foil;

drying the coating solution to form a resin layer;

applying a resist layer coating solution on a surface of the resin layer;

drying the resist layer coating solution to form a resist layer;

patterning the resist layer in a desired shape to form an opening;

preparing an etching solution;

bringing the etching solution into contact with the resin layer located at a bottom of the opening to etch the resin layer; and

and providing a resist layer having an opening at a desired position on the opposite side to a side of the metal foil on which the resin layer is formed to remove the metal foil exposed at a bottom of the opening in the resist layer.

Applicant's prior art fails to teach bringing an etching solution at 65°C or more into contact with the resin layer, wherein the etching solution comprises 3 to 65% by weight alcohol, 10 to 55% by weight alkali compound and water in a weight of 0.75 to 3.0 times a weight of the alkali compound, and wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms.

Suzuki teaches, "A resin etching solution containing . . . an alkali metal compound and water, or an aliphatic alcohol, an aliphatic amine, . . . and a process for etching a polyimide film . . ." (Abstract). "In addition, the alkali metal compound is most

preferably potassium hydroxide . . . but other substances such as sodium hydroxide and lithium hydroxide may also be used, . . ." (column 3, lines 53-57). "Also, they may used in concentrations of about 10-48% is preferred" (column 3, lines 57-64). "The resin etching solution . . . comprises . . . propylene glycol (same as applicant's diol)" . . . they are used in a range of 1%-40%, and most preferably 5%-30% (column 4, lines 23-51). Table 2 (column 10, lines 33-43) lists the composition of potassium hydroxide and water having the same wt %. Hence, one can see that the concentration of the etchant components encompasses those of the claimed invention. Suzuki further teaches, "The etching temperature . . . is generally in the range of 20°C to the boiling point of the system, and preferably 30°C-90°C" (column 4, lines 1-4).

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify applicant's prior art by employing a resin etching solution that comprises a 3 to 6 carbon diol, water, and alkali metal hydroxide, encompasses 3 to 65% by weight alcohol, 10 to 55 % by weight alkali compound, and 0.75 to 3 wt % water, and etches polyimide within a temperature of 65°C, as taught by Suzuki for the purpose of rapidly etching polyimides (Suzuki, column 2, lines 48-57).

Applicant's prior art in view of Suzuki differs in failing to teach applying a coating solution containing a polyimide having an imidation degree of from 50 to 98.

Takahashi teaches, "The polyamic acid (same as applicant's resin) solution is partially imidated . . . to reach an imidation degree of 80% or more" (column 4, lines

59-61), which falls within the range of an imidation degree of from 50 to 98 as claimed in the present invention.

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify applicant's admitted prior art in view of Suzuki by employing Takahashi's method of imidating a resin for the purpose of obtaining a flexible printed wiring board with high heat resistance (Takahashi, column 2, lines 29-30).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 703-306-9074. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 703-305-2667. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Lynette T. Umez-Eronini

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September 2, 2003.